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but

$$y = v_1 z_1 = v_1 \int y_1 dx,$$

by (2). Similarly,

$$y_1 = v_2 z_2 = v_2 \int y_2 dx,$$

$$\cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot \quad \cdot$$

$$y_{n-1} = v_n z_n = v_n \int y_n dx.$$

Hence

$$y = v_1 \int v_2 dx \int v_3 dx \cdots \int \frac{V dx}{v_1 v_2 v_3 \cdots v_{n-1} v_n}.$$

Also solved in the same manner by the Proposer.

MECHANICS.

263. Proposed by C. N. SCHMALL, New York City.

A railroad car is rounding a curve of radius r with a velocity v, $2d$ being the distance between the rails. If h is the distance of its center of gravity above the rails, g having the usual meaning, show that the weight of the car is divided between the outer and inner rails in the ratio $\frac{dgr + v^2 h}{dgr - v^2 h}$.

I. SOLUTION BY H. PRIME, Boston, Mass.

Let R and R' be the reaction of the weight on the outer and inner rails respectively. Then we have for the moments

$$\text{about inner rail,} \qquad 2dR = dmg + \frac{hmv^2}{r};$$

and

$$\text{about outer rail,} \qquad 2dR' = dmg - \frac{hmv^2}{r}.$$

Whence

$$\frac{R}{R'} = \frac{dgr + v^2 h}{dgr - v^2 h}.$$

II. SOLUTION BY J. SCHEFFER, Hagerstown, Md.

Denoting the pressures upon the rails by P and Q, and the angle which a plumb-line makes with the vertical by ϕ, the vertical strikes the distance between the rails at a point distant $d - h \tan \phi$ and $d + h \tan \phi$ from the rails respectively. Hence $P(d - h \tan \phi) = Q(d + h \tan \phi)$. Then

$$\frac{P}{Q} = \frac{d + h \tan \phi}{d - h \tan \phi}.$$

But $\tan \phi = v^2/rg$, and

$$\frac{P}{Q} = \frac{dgr + hv^2}{dgr - hv^2}.$$

No solution of 264 has been received. We shall be pleased to receive solutions of unsolved problems as well as a variety of good problems in the several problem departments.